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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/648,448	08/27/2003	Makoto Kashiwaya	Q75424	4596

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EXAMINER	
LEE, SHUN K	
ART UNIT	**PAPER NUMBER**
2884	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/13/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/648,448	KASHIWAYA ET AL.	
	Examiner	Art Unit	
	Shun Lee	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5,7-11 and 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,7-11 and 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 2, 5, and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwabuchi *et al.* (US 2002/0041977) in view of Kano *et al.* (US 5,012,107) and Nakazawa *et al.* (US 5,023,461).

It should be noted that while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function (MPEP § 2114). In this case, the function (*i.e.*, preventing oxidation) of the barrier film to does not appear to imply any additional structural limitations.

In regard to claims **1**, **2**, **5**, **10**, and **11**, Iwabuchi *et al.* disclose a stimulable phosphor sheet comprising:

(a) a stimulable phosphor layer (paragraphs 30 and 31) containing a europium-activated cesium bromide based stimulable phosphor as a main ingredient, said stimulable phosphor layer being formed by a vacuum film forming technique (paragraphs 6 and 37-42), wherein a maximum intensity of emission generated in the wavelength range of 490-510 nm is equal to or lower than 50% of a maximum intensity of the emission generated in the wavelength range of 440-460 nm (see Fig. 1);

(b) a substrate (paragraph 38) supporting said stimulable phosphor layer; and

(c) a reflective film formed between said substrate and said stimulable phosphor layer, said reflective film for improving efficiency of emergence of stimulated light emission (paragraph 38).

The sheet of Iwabuchi *et al.* lacks an explicit description that emission occurs when the stimulable phosphor layer is exposed to electron beams. However, a claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim (MPEP § 2114). In this case, the intended employment (*i.e.*, exposure electron beams) of the sheet to does not appear to imply any additional structural limitations. Moreover, a stimulable phosphor layer inherently have properties such as emission. Therefore, emission occurring when the stimulable phosphor layer is exposed to electron beams is an

inherent characteristic of the sheet of Iwabuchi *et al.* Alternatively, it would have been obvious to one having ordinary skill in the art at the time of the invention that the sheet of Iwabuchi *et al.* would emit radiation when exposed to electron beams.

The sheet of Iwabuchi *et al.* also lacks an explicit description that said reflective film is a 0.01 μm to 5 μm thin film made of one of Al, Al alloys, Ag and Ag alloys with a barrier film formed between said reflective film and said stimulable phosphor layer for preventing oxidation of said reflective film, wherein said barrier film is a 0.01 μm to 5 μm thin film made of one of silicon oxides, titanium oxides, silicon nitrides, silicon oxynitrides cerium oxides and magnesium fluorides. However, Iwabuchi *et al.* also disclose (paragraph 38) that it is known to provide a light-reflecting layer containing light-reflecting material such as titanium dioxide. Since Iwabuchi *et al.* do not disclose and/or require a specific light-reflecting layer, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified light-reflecting layer of Iwabuchi *et al.* as a conventional light-reflecting layer which does not require further description. Further, Kano *et al.* teach (column 5, line 51 to column 6, line 38) that a light-reflecting layer can be formed from 0.01 μm to 100 μm thick aluminum or silver using vapor deposition, sputtering, plating, or flame spraying. In addition, Nakazawa *et al.* teach (column 9, lines 47-62) to provide a 0.05 to 3 mm lower refractive index layer (2 in Fig. 16 located between a stimulable layer 3 and a support 4 having an optional reflective layer; column 24, lines 20-25) such as a SiO_2 lower refractive index layer (see table 2), in order to minimize a decrease in sharpness due to a protective layer. Therefore it would have been obvious to one having ordinary skill in the art at the

time of the invention to provide a conventional light-reflecting layer (*e.g.*, a ~0.01 μm to ~100 μm thin film made of one of Al or Ag as taught by Kano *et al.*) for the unspecified light-reflecting layer in the sheet of Iwabuchi *et al.* and to provide a 0.05 μm to 3 mm SiO_2 layer between the reflective film and the stimulable phosphor layer in the sheet of Iwabuchi *et al.*, in order to minimize a decrease in sharpness due to a protective layer as taught by Nakazawa *et al.*

In regard to claim **8** which is dependent on claim 1, Iwabuchi *et al.* also disclose (paragraphs 30 and 31) that said stimulable phosphor layer is a layer containing as said main ingredient a cesium bromide based stimulable phosphor using europium as an activator, and a molarity ratio between said activator and said cesium bromide based stimulable ranges from 0.0005:1 to 0.01:1.

In regard to claim **9** which is dependent on claim 1, Iwabuchi *et al.* also disclose (paragraph 43) that a film thickness of said stimulable phosphor layer ranges from 50 μm to 1000 μm.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwabuchi *et al.* (US 2002/0041977) in view of Kano *et al.* (US 5,012,107).

In regard to claim **3**, Iwabuchi *et al.* disclose a stimulable phosphor sheet comprising:

(a) a stimulable phosphor layer (paragraphs 30 and 31) containing a europium-activated cesium bromide based stimulable phosphor as a main ingredient, said stimulable phosphor layer being formed by a vacuum film forming technique (paragraphs 6 and 37-42), wherein a maximum intensity of emission generated in

the wavelength range of 490-510 nm is equal to or lower than 50% of a maximum intensity of the emission generated in the wavelength range of 440-460 nm (see Fig. 1);

(b) a substrate (paragraph 38) supporting said stimulable phosphor layer; and

(c) a reflective film formed between said substrate and said stimulable phosphor layer, said reflective film for improving efficiency of emergence of stimulated light emission (paragraph 38).

The sheet of Iwabuchi *et al.* lacks an explicit description that emission occurs when the stimulable phosphor layer is exposed to electron beams. However, a claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim (MPEP § 2114). In this case, the intended employment (*i.e.*, exposure electron beams) of the sheet to does not appear to imply any additional structural limitations. Moreover, a stimulable phosphor layer inherently have properties such as emission. Therefore, emission occurring when the stimulable phosphor layer is exposed to electron beams is an inherent characteristic of the sheet of Iwabuchi *et al.* Alternatively, it would have been obvious to one having ordinary skill in the art at the time of the invention that the sheet of Iwabuchi *et al.* would emit radiation when exposed to electron beams.

The sheet of Iwabuchi *et al.* also lacks an explicit description that said reflective film is a 0.01 μm to 5 μm thin film made of one of Al, Al alloys, Ag and Ag alloys. However, Iwabuchi *et al.* also disclose (paragraph 38) that it is known to provide a light-

reflecting layer containing light-reflecting material such as titanium dioxide. Since Iwabuchi *et al.* do not disclose and/or require a specific light-reflecting layer, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified light-reflecting layer of Iwabuchi *et al.* as a conventional light-reflecting layer which does not require further description. Further, Kano *et al.* teach (column 5, line 51 to column 6, line 38) that a light-reflecting layer can be formed from 0.01 μm to 100 μm thick aluminum or silver using vapor deposition, sputtering, plating, or flame spraying. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a conventional light-reflecting layer (*e.g.*, a ~0.01 μm to ~100 μm thin film made of one of Al or Ag as taught by Kano *et al.*) for the unspecified light-reflecting layer in the sheet of Iwabuchi *et al.*

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwabuchi *et al.* (US 2002/0041977) in view of Arakawa *et al.* (US 4,645,721).

In regard to claim **7**, Iwabuchi *et al.* disclose a stimulable phosphor sheet comprising:

(a) a stimulable phosphor layer (paragraphs 30 and 31) containing a europium-activated cesium bromide based stimulable phosphor as a main ingredient, said stimulable phosphor layer being formed by a vacuum film forming technique (paragraphs 6 and 37-42), wherein a maximum intensity of emission generated in the wavelength range of 490-510 nm is equal to or lower than 50% of a maximum intensity of the emission generated in the wavelength range of 440-460 nm (see Fig. 1);

(b) a substrate (paragraph 38) supporting said stimulable phosphor layer; and

(c) a 0.1 μm to 20 μm barrier film formed on said stimulable phosphor layer, said barrier film for preventing chemical deterioration (*e.g.*, oxidation) of said stimulable phosphor layer (paragraphs 46 and 47).

The sheet of Iwabuchi *et al.* lacks an explicit description that emission occurs when the stimulable phosphor layer is exposed to electron beams. However, a claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim (MPEP § 2114). In this case, the intended employment (*i.e.*, exposure electron beams) of the sheet to does not appear to imply any additional structural limitations. Moreover, a stimulable phosphor layer inherently have properties such as emission. Therefore, emission occurring when the stimulable phosphor layer is exposed to electron beams is an inherent characteristic of the sheet of Iwabuchi *et al.* Alternatively, it would have been obvious to one having ordinary skill in the art at the time of the invention that the sheet of Iwabuchi *et al.* would emit radiation when exposed to electron beams.

The sheet of Iwabuchi *et al.* also lacks an explicit description that said barrier film is a 0.01 μm to 5 μm thin film made of one of silicon oxides, titanium oxides, silicon nitrides, silicon oxynitrides, cerium oxides, and magnesium fluorides. However, Iwabuchi *et al.* also disclose (paragraphs 46 and 47) that a barrier film can be formed by vacuum deposition method or coating method. Since Iwabuchi *et al.* do not disclose and/or require a specific barrier film, one having ordinary skill in the art at the time of the

invention would reasonably interpret the unspecified barrier film of Iwabuchi *et al.* as a conventional barrier film which does not require further description. Further, Arakawa *et al.* teach (column 10, line 24 to column 11, line 2) to provide a 500 to 20,000 angstroms thick inorganic film (*e.g.*, a nitride such as Si_3N_4) as a transparent protective layer. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a conventional barrier film (*e.g.*, a ~0.05 μm to ~2 μm thick silicon nitride film as taught by Arakawa *et al.*) for the unspecified barrier film in the sheet of Iwabuchi *et al.*

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwabuchi *et al.* (US 2002/0041977) in view of Arakawa *et al.* (US 4,896,043).

In regard to claim **15**, Iwabuchi *et al.* disclose a method of producing stimulable phosphor sheet which comprises: a stimulable phosphor layer (paragraphs 30 and 31) containing a europium-activated cesium bromide based stimulable phosphor as a main ingredient, said stimulable phosphor layer being formed by a vacuum film forming technique (paragraphs 6 and 37-42); and a substrate (paragraph 38) supporting said stimulable phosphor layer, wherein a maximum intensity of emission that is generated in a wavelength range of 490-510 nm is lower than a maximum intensity of the emission generated in a wavelength range of 440-460 nm, said method comprising:

(s1) a step of preparing said substrate in a film forming system;

(s2) a step of evaporating both of europium and cesium bromide by using a resistance heating in said film forming system;

(s3) a step of performing evaporation under an evaporation atmosphere of $1.33x10^{-2}$ Pa (which is in a range of 0.01-3 Pa) to form said stimulable phosphor layer in said film forming system;

(s4) a step of heating said substrate during said evaporation; and

(s5) a step of annealing said stimulable phosphor layer after it was formed on said substrate,

wherein a heating temperature for annealing said stimulable phosphor layer is in a range of 150-250°C.

The method of Iwabuchi *et al.* lacks an explicit description that emission occurs when the stimulable phosphor layer is exposed to electron beams and that a heating temperature for heating said substrate is in a range of 120-250°C. However, the stimulable phosphor layer have properties such as emission. Therefore, emission occurring when the stimulable phosphor layer is exposed to electron beams is an inherent characteristic of the sheet of Iwabuchi *et al.* Alternatively, it would have been obvious to one having ordinary skill in the art at the time of the invention that the sheet of Iwabuchi *et al.* would emit radiation when exposed to electron beams. Further, Iwabuchi *et al.* also disclose (paragraph 39) to heat the support. Since Iwabuchi *et al.* do not disclose and/or require a specific support temperature, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified support temperature of Iwabuchi *et al.* as a conventional support temperature which does not require further description. In addition, Arakawa *et al.* teach (column 10, lines 57-64) that a substrate is heated to approximately 25-400°C during vacuum deposition of a

phosphor. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to select a known substrate temperature (*e.g.*, 25-400°C) as the unspecified substrate temperature in the method of Iwabuchi *et al.*

Response to Arguments

7. Applicant's arguments filed 7 December 2006 have been fully considered but they are not persuasive.

Applicant's arguments (third paragraph on pg. 7 to last paragraph on pg. 9 of remarks filed 7 December 2006) with respect to amended claims have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues (last paragraph on pg. 10 of remarks filed 7 December 2006) that Iwabuchi *et al.* do not disclose a range of temperatures for the substrate heating. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, Arakawa *et al.* teach (column 10, lines 57-64) that a substrate is heated to approximately 25-400°C during vacuum deposition of a phosphor. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to select a known substrate temperature (*e.g.*, 25-400°C) as the unspecified substrate temperature in the method of Iwabuchi *et al.*

Applicant argues (second paragraph on pg. 11 of remarks filed 7 December 2006) that that Table 1 on page 20 in the present specification shows the

criticality of the presently claimed range and that the experimental evidence in the present specification shows that heating the substrate at a temperature outside the 120-250°C range recited in claim 25 does not provide the excellent results provided by the present invention. Examiner respectfully disagrees. The issue is whether the properties differ to such an extent that the difference is really unexpected (MPEP § 716.02). In addition, the evidence relied upon should establish that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance (MPEP § 716.02(b)). The specification states (first paragraph on pg. 19) that "The above-described procedure was repeated under various conditions for heating the substrate during film formation (not heated or heated at l00 °C, 200 °C or 300 °C) and subsequent annealing (not annealed or annealed at 100 °C, 200 °C or 300 °C), thereby preparing a total of 16 phosphor sheets". Thus there does not appear to be any evidence of the statistical significance of Table 1. Further, table 1 clearly shows that there are 100°C and 300°C substrates which produce sheets labeled as satisfactory (o in table 1) and there is also a 200°C substrate which produce a sheet labeled as problematic (x in table 1). Therefore, the evidence relied upon did not establish that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 5,059,475 (Sun *et al.*) discloses that a silicon dioxide coating protect a metal film on a substrate from oxidization (column 2, lines 58-67).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SL

CONSTANTINE HANNAHER
PRIMARY EXAMINER